

REMARKS

This response, submitted in response to the non-final Office Action dated August 23, 2005, is believed to be fully responsive to the points of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

Claims 1-22 are pending. Claims 1-3 and 6-22 have been rejected under 35 USC 103(a) over US Patent No. 6,002,706, in view of US Patent No. 6,548,782 (Dykes), in further view of US Patent No. 5,987,042. The Examiner indicated that Claims 4 and 5 would be allowable if rewritten in independent form. Applicants respectfully submit the following remarks in support of the patentability of the pending claims.

1. Claims 1-11:

The Examiner indicated that Claims 4 and 5 would be allowable if rewritten in independent form. Claim 6 depends from Claim 5. Accordingly, Applicants submit that Claim 6 also contains allowable subject matter.

As regards the independent claim, Claim 1 is directed to a system for laser shock peening (LSP) a workpiece having a confinement fluid film thereover. The system includes a peening laser for projecting a pulsed laser beam at a target site on the fluid film atop the workpiece. The system further includes a monitor to monitor the film at the target site. The monitor includes a probe laser for projecting a probe laser beam at the target site and an optical detector optically aligned with the target site for detecting reflection of the probe beam therefrom. The system further includes a controller operatively coupled to the peening laser and detector for initiating the pulsed laser beam in response to the quality of the monitored film.

FIG. 1 of the present application illustrates an exemplary LSP system. Reference numeral 20 indicates the peening laser for projecting a pulsed laser beam at a target site on the fluid film atop the workpiece. (See for example, paragraph 18 on page 4.) A monitor 34 to monitor the film at the target site is described beginning on paragraph 24 on page 5. The monitor includes a probe laser 36 for projecting a probe laser beam at the target site (FIG. 1, paragraph 25 on page 6) and an optical detector 40 optically aligned

with the target site for detecting reflection of the probe beam therefrom (FIG. 1, paragraph 26 on page 6).

In contrast, none of the references cited by the Examiner discloses a monitor to monitor the film at the target site, which includes a probe laser for projecting a probe laser beam at the target site, as recited by Claim 1.

US Patent No. 6,002,706 is directed to a method and apparatus for controlling the beam size of a laser. US Patent No. 6,002,706 does not teach or suggest a monitor to monitor a confinement fluid film at a target site, as recited by Claim 1. Instead, US Patent No. 6,002,706 measures the fluence distribution of the laser beam. As explained for example in Col. 3, lines 27-35 and as shown for example in FIG 1, the laser beam is incident on lens 104. After lens 104, a beam splitter 105 redirects a portion of the beam energy to detector 10. As explained, for example at Col. 4, lines 47-54, the detector 106 supplies data, which represents the spatial energy distribution of the laser beam (Col. 4, lines 47-54). Thus, US Patent No. 6,002,706 does not monitor a confinement fluid film at a target site but rather measures the fluence distribution of the laser beam using the portion of the laser beam deflected by beam splitter 105.

In addition, US Patent No. 6,002,706 does not disclose a controller operatively coupled to a peening laser and detector for initiating the pulsed laser beam in response to the quality of a monitored film, as recited by Claim 1. Rather, US Patent No. 6,002,706 discloses a lens controller for adjusting a position of the lens with respect to the target based on the measured fluence distribution of the laser beam. (Abstract)

Moreover, US Patent No. 6,002,706 does not employ a probe laser for projecting a probe laser beam at the target site, as recited by Claim 1.

Dykes is cited to supply the controller deficiency of US Patent No. 6,002,706. However neither US Patent No. 6,002,706 nor Dyes teaches a monitor to monitor the film at the target site, which includes a probe laser for projecting a probe laser beam at the target site, as recited by Claim 1. Instead, US Patent No. 6,002,706 measures the fluence distribution of the laser beam using the portion of the laser beam deflected by beam

splitter 105, as discussed above. Dykes employs a measurement device 15 capable of measuring the thickness of both paint and water (Col. 7, lines 50-53).

Thus, the proposed combination of US Patent No. 6,002,706 and Dykes does not include a monitor to monitor the film at the target site, which includes a probe laser for projecting a probe laser beam at the target site, as recited by Claim 1. US Patent No. 5,987,042 does not supply this deficiency of US Patent No. 6,002,706 and Dykes.

The Examiner cites US Patent No. 5,987,042 as teaching the use of a Q-switch and clock signal. However, US Patent No. 5,987,042 does not disclose a probe laser, as recited by Claim 1, and thus does not supply this deficiency of Sokol and Dykes. For at least these reasons, Applicants submit that Claim 1 is patentably distinguishable over the cited art, either alone or in combination. As Claims 2, 3 and 6-11 depend from Claim 1, these claims are also patentably distinguishable over the cited art for at least these reasons. Accordingly, Applicants respectfully request that the rejections of Claims 1-3 and 6-11 be withdrawn.

2. Claim 12-17:

Claim 12 is directed to a system for laser shock peening a workpiece having a confinement fluid film thereover. The system includes means for projecting a pulsed laser beam at a target site on the fluid film atop the workpiece. The system further includes means for monitoring the film at the target site by reflecting and detecting a probe laser beam from the target site. The system further includes means for controlling the pulsed laser beam in response to the condition of the monitored film.

As discussed above, US Patent No. 6,002,706 does not teach or suggest means for monitoring the film at the target site by reflecting and detecting a probe laser beam from the target site or means for controlling the pulsed laser beam in response to the condition of the monitored film. For example, US Patent No. 6,002,706 does not monitor the film at the target site. Rather, US Patent No. 6,002,706 measures the fluence distribution of the laser beam. Nor does US Patent No. 6,002,706 reflect and detect a probe laser beam from the target site. Rather, a beam splitter 105 redirects a portion of the beam energy to detector 10. (Col. 3, lines 27-35; FIG 1) Dykes is cited to supply the controlling means.

However, none of the cited references discloses means for monitoring the film at the target site by reflecting and detecting a probe laser beam from the target site, as discussed above with respect to Claim 1. In particular none of the cited references teaches reflecting and detecting a probe laser beam from the target site, as recited by Claim 12.

For at least these reasons, Applicants respectfully submit that Claim 12 is patentably distinguishable over the cited art, either alone or in combination. As Claims 13-17 depend from Claim 12, these claims are also patentably distinguishable over the cited art for at least these reasons. Accordingly, Applicants respectfully request that the rejections of Claims 12-17 be withdrawn.

3. Claims 18-22:

Claim 18 is directed to a method for laser shock peening a workpiece having a confinement fluid film thereover. The method includes projecting a pulsed laser beam at a target site on the fluid film atop the workpiece. The method further includes monitoring the film at the target site by reflecting and detecting a probe laser beam from the target site. The method further includes controlling the pulsed laser beam in response to the condition of the monitored film.

As discussed above, none of the cited references teaches or suggests monitoring the film at the target site by reflecting and detecting a probe laser beam from the target site, as recited by Claim 18. For at least these reasons, Applicants respectfully submit that Claim 18 is patentably distinguishable over the cited art, either alone or in combination. As Claims 19-22 depend from Claim 18, these claims are also patentably distinguishable over the cited art for at least these reasons. Accordingly, Applicants respectfully request that the rejections of Claims 18-22 be withdrawn.

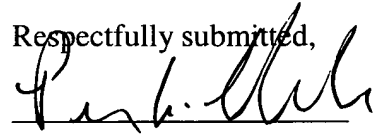
CONCLUSION

In view of the foregoing, Applicants respectfully submit that the application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are respectfully requested.

Please charge all applicable fees associated with the submittal of this Amendment and any other fees applicable to this application to the Assignee's Deposit Account No. 07-0868.

Should the Examiner believe that anything further is needed to place the application in even better condition for allowance, the Examiner is requested to contact Applicants' undersigned representative at the telephone number below.

Respectfully submitted,



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